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PRODUCT DEVELOPERS' RELATIONS TO THEIR USERS - AN INTERVIEW STUDY

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Abstract

The purpose of this interview study is to investigate how people involved in product development communicate and work with the users. Four companies from two different branches have been investigated, in order to investigate differences. Two of the companies develop hand tools for professional use and the other two develop durable consumer products. Three people from each company have been interviewed: a design engineer, a market representative or a market manager and a product development manager. The result shows that none of the investigated companies have a defined and documented procedure for describing their intended end users. The two companies that develop consumer products have descriptions of their market segment. The companies that develop hand tools for professional use are more directed to the end user than for example the sales companies and its product developers have a closer direct contact with the users than the developers of consumer products. For the developers of the consumer products it is instead more vital that they also consider the distributors and sellers. The knowledge and use of product development methods for consideration of user aspects, is rather low. None of the companies use formal methods to analyse and generate new ideas about the user or the use situation.

1 Introduction

The importance of product developers' awareness of and focus on the product users has increased over time. Customers' demands are continuously increasing, not only expecting excellent functionality and usability, but also pleasure from product use and ownership [Jordan, 1998]. At the same time the distance between consumers and product designers has enlarged, for example as an effect of the expanded globalisation [Ekström and Karlsson, 2001]. Market orientation and customer involvement are critical success factors in new product development [Cooper and Kleinschmidt, 1990; 1995]. Despite this, many companies'

new product projects have a deficient market orientation and costumer focus [Cooper and Kleinschmidt, 1995]. They fail in building in the voice of the customer [Cooper, 1999].

Several authors, e.g. Gould [1995], Margolin [1997] and Preece [2002], have emphasized the importance for designers to know for whom they design. Therefore it is essential to define the intended users. A study made by Cooper and Kleinschmidt [1990] showed that successful products have clear definitions of the target market - exactly who the intended user is, and the customer needs, wants and preferences, before the project is approved. According to Gould [1995] it is better to define the user early in the design phase, even if the user group eventually is going to expand from the initial definition, otherwise the design work is likely to become ambiguous when it comes to consideration of user aspects. The contrary case, to try to design for everybody or an average user causes problem since that person does not exist, and a product adapted to that average user might not suit any real users [Friedman, 1971]. Working with usability, the details in the task and environment are significant and to design for general users enlarge the risk to disregard these details [Buur and Nielsen, 1995].

User characters [Djajadiningrat et al., 2000; Fulton Suri and Marsh, 2000; Högberg, 2003], users classification [Janhager, 2003a] and different scenario techniques [Fulton Suri and Marsh, 2000; Janhager, 2003b] are various methods to animate the users and avoid this general way of considering and perceiving them. Moreover, it is essential to have contact with the users and learn about their needs by for example interviews, observations and discussion groups [Gould, 1995; Stanton, 1998]. Ekström and Karlsson [2001] present some problems for creating customer satisfaction, for instance that the companies has too much focus on competitor analysis and benchmarking rather than on the customers. Moreover they maintain that the accessible methods are insufficient in a product development context. For example, traditional market studies do not provide product developers with enough detail information to work on an operational level, such as designing the product. The information is more suited for strategic decisions [Griffin and Hauser, 1993].

The aim of the research behind this paper has been to investigate how developers, involved in early stages in product development, communicate and work with the users. Four companies have been investigated - two companies develop hand tools for professional use (company A and B) and two companies develop durable consumer products (company C and D), see Table 1. All the companies are located in Sweden and have more than 200 employees. Three people from each company have been interviewed, a design engineer, a market representative or a market manager and a product development manager.

Table 1. The investigated companies.

	Company A	Company B	Company C	Company D
Products	Professional hand tools	Professional hand tools	Durable consumer products	Durable consumer products
Number of employees	700	200	1100	600
Interviewed competences	Design engineer Market representative PD-manager	Design engineer Market- and sales manager PD-manager	Design engineer Market representative R&D-manager	Design engineer Market- and sales manager PD-manager

It is investigated how the three disciplines work with the user aspects and if their contacts, considerations and views of their users differ between the three disciplines. Moreover it is explored which methods the companies use for bringing in the user aspects in the design work.

The same interview guide has been used for each subject in all four companies and following issues were treated:

- The existence of procedures for describing the companies' intended users
- The product developers' contact with the users
- The way in which the information about the users reaches the product developers
- The target group priority in product development
- The utilization of tools and methods that consider the user

The interviews were semi-structured [Lantz, 1993] and they were recorded on tape and written out before they were analysed.

2 Result

2.1 Company A

The interviewees from Company A seemed to have a clear picture of their users. The user group is quite homogenous, and consists mainly of large and strong males. However, this picture differs in the various markets and their product does not suit all markets, for instance the Asian market. The company does not have any documented established description of their users or market segments.

It was declared that the product developers' primary focus during product development is most directed towards the end users. During field studies, it is the operator and not the foreman or someone else who is interviewed. The users have, at least in Europe, the power to decide which product is to be bought by their company. "*If the operator does not want to use the product, it is impossible to sell it.*"

The market representative stated that he has close contact with end users. He travels 40% of his time and encounters users in every customer meeting. Before product planning and during the initiation of the pre-series he meets users. The continuous follow-up observations are handled by the sales companies; since the company has customers all over the world it is impossible for them to handle all contact. Also, the design engineer has direct contact with the users. He had met users two to three times this year. The reasons for his visits were often other than analysing the projected product before product planning, but matters such as checking up a machine or an application already in use. The PD-manager has also contact with users, at least once a year.

These product developers are not users of the products they are developing and therefore they have no experience of using the tool for whole workdays, most days a week. In order to understand this, the contacts with the users are of vital importance. All the product developers had tried the product in an actual situation in a true working environment, but at a limited time and effort. The weight of direct information from the users was emphasized. "*It is much more valuable to get the information directly, than to let it get filtered through seller to distributor to our seller and our product manager and then to us. In the end, you do not know which person who wanted the change from the beginning.*" Anyhow, most of the information about the users comes from the sales companies and reach the product developers through the market division. All the subjects thought that it should be advantageous to increase the design engineers' contact with the users. It is efficient and it should improve the utilization of the users' needs, were some of the arguments.

Even if disadvantages predominate, there might also be advantages of not being user of the product one is developing, such as the their ability to see the product from another view of angle. "*You are allowed to ask the stupid questions*".

In order to learn to know the user of their product, the company works with interviews and field studies. The company does not have any formal support methods for working with the users. It has a working procedure, but it is not standardised. Video camera is not used for analysing use sequences or situations. The design engineer usually brings a camera when he visits the users' place of work. However, it is hard to get permission to take photos. The company does not use QFD and two of the interviewees did not know what it is. According to the PD-manager they work with marketing research, however neither the design engineer nor the market representative knew that.

The opinions about the need of more methods considering the user aspects were divided. The market representative considered their working methods as well functioning, while the design engineer desired better methods to learn more about the users. Since the design engineer did not know about the existing market research, he emphasized that this kind of research is a necessity to know that they are doing the right thing. He believed that formal methods are important to analyse the use of their product in order to find out kernel part of the design issue and obtain quantified values of that. "*Otherwise, the decisions are based mainly on subjective judgement.*"

2.2 Company B

The other tool developing company's users can be of a great variety, e.g. related to age, sex and hand size. They do not define and document a description of their users or market segments. However, by recording sales figures of articles consumed by the tools, the company knows who the important users of its products are, and targets them for user interviews. One subject highlighted that it is more fruitful to meet frequent users than occasional users of their product, since they have more opinions about the product.

Similar to company A, the main focus is on the end users' requirements during product development. Also this company's users decide which tool their companies are going to buy. The users' requirements are more valued than e.g. the purchasers' requests. All the interview subjects have frequent or occasional contact with users. The market manager meets users five to six times every year and the design engineer had met users three to four times this year. The market manager and design engineer visit users during pre-study and prototype stages, and they always do that accompanied by salesmen. It was relatively new for this company to let design engineers go out and interview users.

All the subjects considered meeting the users as essential to learn about the use of their product in an actual environment. The design engineer thought that it might be more important that he and other design engineers have contact with the users than the market representatives. According to the market manager, the design engineers and other key persons, such as foremen from manufacturing and assembly, only have a vague understanding of the use of the product. The interviewees believed that it would be fruitful if these persons would meet the users and see the applications of their product. As the company have had internal courses of instruction in using this tool, the product developers have some notion of how it is to work with the product.

This company has recently introduced a new questionnaire, which the design engineer used during the user visits. The questionnaire covers, amongst others, ergonomic issues such as working posture and experienced comfort. The market manager explained that he often uses videotaping to convey a better picture of the use of the product within the company. However, it appears that the design engineer has not seen these films. QFD or external market analyses do not seem to be used. It was agreed that it should be useful with design methods supporting user consideration. The interviewees requested structured methods for analysis, evaluation and valuing of qualities and opinions. "*We build our own methods here and I believe that there are better ways of working with this.*"

2.3 Company C

The interviewees from Company C had a quite general picture of the users. The user can be anyone - man, woman, young, old, etc. However, the company is directed towards a market segment where their particular consumers belong to the most demanding category of consumers.

The company does not have a defined and documented procedure for describing the users they are targeting. However, its central market division has defined market segments, which describe the users' way of life, age, beliefs and so on. However, none of the interviewed product developers consider them when they develop the products. As indicated by an interviewee, they do not have to care about these market segments, since the requirement specification they receive in beginning of a project already comprises demands built on them. Another subject meant that he does not consider these descriptions too much because there is no person who suits in the picture. His view was that it is better to try to design a product adapted to all people or to as many as possible.

Besides the user, the product developers have to give priority to the sales organisations' demands on the product. There were also indications that the sales organisations are given the primary focus and that this is quite in order. It is believed that the sale organisations' demands on the product are the same as the users'. "*Since, the sellers receive information about the end customers' wishes.*" Moreover, the brand organisation, which is the orderer, has a high influence of the product performance. Even if results from a user clinic points in another direction than the brand organisation's conception, the product developers often have to accept the brand organisation's demands for the product to suit the product family line.

The company does not work actively with meeting users. Neither of the interview subjects have formal contact with users. Two of them have had that in their past. However, the product developers are also users and have daily contact with other users, such as relatives and friends. They do not think that there is a risk that their own personal wishes influence the product design too much. Besides, the market division is supposed to feed the product developers with viewpoints and information from the field, through wholesalers, sales companies and distributors. Two of the interviewees were in doubt that the information they receive from the central marketing division really is based on facts and not just opinions from people in high positions. The third person was quite satisfied with the second hand information. He thought it is better to get the information filtered in a collected and concise form than to get many different impressions from diverse persons. "*It is not interesting to get the opinions from one user, but if many users feel the same thing, then it is important*". Two of the interviewees stated that it sometimes would be fruitful to get more information about the user, but that it is a question of resources. "*It is always desirable to meet the user, you should not forget who pays in the end.*"

The subjects saw mainly advantages of being user themselves to the product they are developing. "*There are never such good opportunities to learn so much about a product, as when you are using it by yourself*". One disadvantage may be that you normally are not able to test competing products at the same time. The design engineer noticed the fact that the product developers in some way are expert users of their products and that could cause difficulties in comprehending "ordinary" users' thinking. "*You may not see the product in the same way as a "normal user". The "normal user" could complain about something in the product that I think is totally normal, because I know the reason for its performance.*"

Sometimes, if the product developers need direct feedback during a running project, they arrange user clinics, where users come for a half or an hour to have opinions about the prototypes or competing products. Someone is taking notes when the users are interviewed or observed, but they are not videotaped. However, it appears that the interview subjects seldom are participating. They use FMEA and QFD occasionally or mostly "small-QFD", which is a shortened version of a mixture of FMEA and QFD that derives its origin from Mercedes (DaimlerChrysler). According to the market representative, she is not participating in these FMEA and QFD sessions. It was given divergent information concerning the question if they use video camera for filming use sequences. The design engineers stated that the market division uses video camera, the market representative said that they do not use it in their factory and the PD-manager said that they do it now and then. According to the design engineer, they perform market research and the outcomes from that result in some of the requirements on the product.

2.4 Company D

Company D has like Company C also a broad representation of its users. It was believed that the company's users are little more educated and better informed than the general consumer. Like the other companies, this company does not have a defined procedure for describing its users. However, the product developers investigate who the end customers/users are. The product developers have created a picture of the users based upon a questionnaire, which is enclosed to the product the users buy. The consumers are asked to fill in and return the questionnaire after they have used the product for some time. From the anonymous questionnaire the product developers obtain information about for example the consumers' living situation, income and education. Furthermore, they get a hint of what the users think about the product and the incitements to their purchase. The result from the questionnaire is a good support for the marketing and sales department and also for the product development department as they get information about what they should concentrate on in future products.

The concentration during product development is split into three target groups - the distributor, the sales organisation and the user. It is essential to satisfy all three parts. If the distributors are neglected, they do not want to sell, and the sales companies must get sufficient margin. According to one of the subjects, the salesman may, in eight of ten cases, decide which product the user will eventually buy. Naturally, the sellers choose the product that gives most profit. The design engineer indicated that he is struggling for the user demands. "*As a design engineer you try to think of the user and how I would like to use the product, that's what I am striving for.*" He mentioned that he feels some ambivalence for the sellers' and distributors' demands. Moreover, it is necessary to consider the demands from the various test institutes, such as national board for consumer policies.

None of the interview subjects work actively with meeting customers. Instead, the information about the users reaches the product developers through the market division. The information is based upon the questionnaire mentioned earlier, or comes from sales companies and distributors. Sometimes dissatisfied users send e-mails and make telephone calls to the product developers. More general viewpoints reach the product developers through their after-sales or service departments. There were some different opinions about the importance of the product developers' contact with users. The market manager thought that the principal thing is that the product developers receive the information about the users, and who is to deliver it is not very important. The design engineer was of the opinion that it is good to get the information directly, as second hand information always is slightly distorted from the original facts. He believed that it is no disadvantage with more user contact. However, he went on explaining that the obstacle to this was the shortage of resources. "*Everybody cannot work with everything*". The PD-manager also thought that it is important that product developers have contact with the users. He added that all people working in the company already have that in one or another way, since the product developers also are users to the product and daily come in contact with other users, such as relatives and friends.

The perceived advantages of being both developer and user to the product are that it is possible to learn about the product and come across problems in the daily life the product developers otherwise should not have thought of. There are also opportunities to get input from people around. "*It is positive to work with things that people have opinions on.*" The same conditions could also be seen as disadvantages. An interview subject stated that it sometimes could be trying with all the relatives and friends who want help with and advice about their products. The product developers' situation can also lead to a shortage of opportunities to use competing products. However, the so-called "home testers", i.e. employees who test products at home, also try competing products.

As mentioned above, a questionnaire is enclosed with the product in order to investigate their user segments. The product developers had just arranged a questionnaire to their distributors and they intended to develop one for their sales companies. Moreover, they work with environmental business analyses and external market research. FMEA is used and they have tried QFD, but they consider it too demanding in relation to the outcome. They do not use video camera, but they believe that the external industrial design firm they work with do that. According to the PD-manager they have more methods directed to the sales organization than to the end users. The design engineer and the market manager think that they do not need more methods. The latter's opinion is that they obtain a general picture of the users with help of the questionnaires. He believes that more methods could lead to results being based upon opinions of a few persons. The PD-manager explained that the use of methods is balanced against the availability of resources.

2.5 A comparison between the companies

The results are put together in a table (Table 2) to facilitate the comparison of the four companies.

Table 2. The result from the interviews.

	Company A	Company B	Company C	Company D
Developing	Hand tools	Hand tools	Consumer products	Consumer products
The user group	Homogenous	Varying	Varying	Varying
Procedure for defining the users	No	No	No	No
Description of the market segment	No	No	Define intended market segment	User profile, built on questionnaires
The primary target groups they are directed towards	Users	Users	Users, sales companies	Users, sales companies and distributors
Market research with external support	Yes, but the design engineer and market representative did not know about it	No	Yes	Yes
Formal contact with users	Yes (all of the subjects)	Yes (all of the subjects)	No (none of the subjects)	No (none of the subjects)
Videotaping use sequences	No	Yes	?	No (not initiated by the company)
QFD	No	No	Yes (version of)	No
Other types of formal methods considering the use/user, such as scenario techniques or user characters	No	No	No	No

3 Discussion

The result from the interviews clearly indicates that the companies that develop tools were more directed to the users than the companies developing consumer products. The tool developers also have a closer contact with the end users and another attitude to it. They believe to a larger extent that the contact is very important to them than the consumer product developers do.

There are many possible explanations for this. The main reason is probably that the tool developers do not know how it is to work with the tools many hours per day and therefore they need the operators' opinions and guidance, while the consumer product developers know how it is to use the product. Also, the high workload on the operators using the tools means that the products' ergonomic properties are crucial, and such information is better communicated directly between the user and the designer, compared with via documents and other persons. User focus is particularly important in a situation where operators can affect the purchasing decision. Users of consumer products have the option to decide which product they are going to buy. However, they are in an exposed position, since they do not have the opportunity to try different products for a longer time and also are influenced by the seller, whose knowledge and ability to convince and sell may strongly influence the purchase. Moreover, even though the consumer products have a long life span, they are not going to be used actively for many hours per day like the tools. Poorly designed tools strongly influence the users' performance negatively and may lead to injuries. This calls for thoughtful consideration of ergonomics in the hand tool design process. For consumer products, poor ergonomics may cause annoyance and disappointment, but other values such as aesthetics may be more important for the choice of product.

The size of the company may influence the frequency and attitude towards the contact with the users. One of the tool developing companies was the smallest of the investigated companies and according to a study made by Janhager et al. [2002], product developers in small companies normally have better contact with the users than people in large companies.

Another reason for the tool developers' tight contact with the users could be that they have a more natural contact to the end users through the sellers. The access to private persons may not be that obvious, still it is possible through advertising, and relatives and friends. This accessibility to users through sellers leads to the effect that the developers of the tools turn to customers, where they already are established, for investigating the use of their product. It is easier to get in touch with them through the sales companies. Furthermore, customers who use their product frequently are more popular to visit than others, as they have more comments of the use than the occasional users. However, it is also important to investigate occasional users as well as companies that use competing products in order to investigate the reasons to this. It may be possible to change the product or the applications to suit these companies better. Frequent buyers are probably the same as satisfied customers.

In the two tool companies the trend is that the user contacts have increased over the last years. This fact is also noticed by Bødker [2000] in her studies of three companies, where the companies had increased the user involvement, by moving out the lab into the field.

The interviewees from the consumer product companies saw mostly advantages of being users to the product they develop. Moreover, many of them also think that they do not need to have any contact with other users, since they could ask themselves and other colleagues. There are reasons not to rely too much on the fact that the product developers are users by themselves or their confrontation with other users through relatives and friends. For example, it is not reliable to assume that the product developers use the product frequently at home and also think about these questions when they are not working. The product developers may not always want to interview and actively think on problems and new solutions when they meet users to their product.

Some interviewees argued that the sellers and distributors could represent the users, as they know what the users want and therefore their wishes are the same as the users. This is not completely true, since everybody has his or her own interests. The sellers' requirements are adapted to sell as many products as possible, in other word convince a large number of presumptive customers, while the users' wishes are connected to their use of, and satisfaction from possessing, the product. It is not certain that these wishes are the same. For example, many functions on a cellular phone is a selling argument even if they may not be used by the prospective buyer. However, the companies have to strategically decide if they are going to primarily target the end user or the seller. To target the sellers could be a short termed approach. On the other hand, if the product developers do not have the sellers support the products may never reach the users. The sellers also supply products from other product development companies. Consequently, as some of the interviewees maintained, the natural solution is probably to target all three parts - distributors, sellers and end users.

The companies use few formal design methods to support the work with the users. Videotaping is a very good means for analysing the use, as one subject sad: "*Sometimes you do not realise how the product in fact is used.*" By watching use sequences on video, actual use behaviour could become much clearer. Probably, product development could be more fruitful and attractive if more stimulated methods, such as scenario technique and user characters were used. Three of four companies carry out market research with external support. However, in many cases the results from these seemed not to be communicated to the design engineers and in one case not even to the market representative. On the other hand, some consumer product developers seemed to rely too much on the market research. As mentioned in the introduction, results from market research mainly give information to

strategically decisions and not about the performance of the product [Griffin and Hauser, 1993].

None of the companies have a defined and documented procedure for describing the users they are supposed to target. However, the consumer product developers have descriptions of their market segment. According to Cooper and Kleinschmidt [1990], a definition of the intended users is an important factor for winning products. It seemed to be more important for the consumer products developers to know whom they are intended to target. The reason for this is probably that the tool developing companies are more limited. They already have a defined market, which also is smaller.

It was not possible to discern any general differences between the interviewed disciplines' view of the users or to whom they were directed towards.

The low number of interviews restricts the reliability of this study. Moreover one could question whether all design engineers in the tool developing companies meet users every year.

4 Concluding remarks

With the adoption that the investigated companies correspond to a general picture of other companies in similar branches, some questions are raised from the results of this interview study:

- Since none of the investigated companies have a defined and documented procedure for describing their intended end users, the question is how do they ensure that all the product developers know for whom they should design? It is suggested that companies need support in finding ways of defining their intended users, which might be a future area of research. Another question is about the conditions of this definition. Should it be based upon the users' qualities and abilities; ways of life (family, living and economy); wishes, visions and goals or physical conditions? Moreover, requirements are formulated from the technical perspective and not a user perspective. How can the product developers ensure that their products are suited to the users?
- It seems to be a difference in the two branches' contact and work with the end users. Therefore, a question is raised concerning the user awareness in other branches such as public products (e.g. busses, cash dispensers and pay machines) and products with both professional and amateur users (e.g. cars, chain saws and computer mice). How do they work with the users and could the different branches learn from each other?
- The awareness and knowledge about the users enhance the motivation and innovation in product development activities. How to manage this in a context where organisations are getting bigger and the physical distance to the users is growing in many companies?
- In both the investigated branches the sellers appear to have the closest contact with the users and much information about the users comes from them and reaches the product developers through the market division. What is the effects of the fact that most of the information regarding the users is transferred via the sellers?
- The knowledge and use of formal product development methods, which consider the user aspects, is rather low. None of the companies use formal methods to analyse or generate new ideas about the user or use situation. How to enhance the companies' knowledge of formal methods, such as scenario technique, and their benefits?

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